S
331.12
E10mm
1974

PLEASE RETURN

montana manpower 1980

STATE DOCUMENTS COLLECTION
JUN 27 1978
MONTANA STATE LIBRARY
930 E Lyndale Ave.
Helena, Montana 59601

PROJECTED EMPLOYMENT BY INDUSTRY
AND SELECTED OCCUPATIONS, 1970 - 1980

MONTANA STATE EMPLOYMENT SERVICE

MONTANA STATE LIBRARY
S 331.12 E10mm c.2
Montana manpower :projected Montana empl
3 0864 00004949 7

next one available March or April

MONTANA MANPOWER

PROJECTED MONTANA EMPLOYMENT BY INDUSTRY AND SELECTED OCCUPATIONS

1970 - 1980

MONTANA STATE EMPLOYMENT SERVICE
EMPLOYMENT SECURITY DIVISION
DEPARTMENT OF LABOR AND INDUSTRY
Box 1728
Helena, Montana

Prepared by:
Research and Analysis
Montana State Employment Service

SEPTEMBER 1974

Third Edition

COVER PHOTO

A multi-colored mosaic done by Billings artist John Morrison graces the lobby entrance of the Montana Employment Security Division Building. It depicts the cornerstone of Montana's economy - industry and workers.

TABLE OF CONTENTS

		Page No.
I	Introduction	1
II	Economic Assumptions	3
III	Development Forecasts	4
IV	Decker - Birney Area	9
V	Coal Development in Montana	9
VI	Construction	12
VII	Industry Employment Outlook	15
VIII	Employment by Occupation	28
	Methodology	54
	Bibliography	56

LIST OF TABLES, GRAPHS AND MAPS

TABLES

		Page No.
Table I	Employment by Industry	20
Table II	Percentage of Total Employment by Industry	21
Table III	Change from 1970 by Industry	22
Table IV	Additional Employment Opportunities Created by Coal Development by Industry	23
Table V	Montana Total Employment by Industry 1970, Base, Scenario I and II, and Scenario III	24
Table VI	Employment by Occupational Group	30
Table VII	Occupations as Percent of Total Employment	31
Table VIII	Change from 1970 by Occupational Group	32
Table IX	Additional Employment Opportunities Created by Coal Development by Occupational Group	33
Table X	Average Annual Job Opportunities by Occupational Group: 1970 - 1980	34
Table XI	Average Annual Job Opportunities Created by Coal Development by Occupational Group	35
Table XII	Selected Occupations by Occupational Group Under Scenario I and II having Average Annual Openings of 100 or More	36
Table XIII	Montana Employment 1970 - 1980 by Occupation Under Different Coal Development Forecasts and Annual Job Opportunities 1970 through 1980 by Occupation Under Scenario I and II	38

LIST OF TABLES, GRAPHS AND MAPS

MAPS

		Page No.
Map I	Map Showing Coal Development Sites Under Scenario I: 1980	6
Map II	Map Showing Coal Development Sites Under Scenario II: 1980	7
Map III	Map Showing Coal Development Sites Under Scenario III: 1980	8

GRAPHS

Graph I	Construction Force Required to Construct Coal Development Sites Under Scenario II: 1973 - 1980	14
Graph II	Percent Increase (Decrease) From 1970 by Industry	19

I. INTRODUCTION

In recent years, public demand for clean air and higher anti-pollution standards has focused attention on utilizing sources of energy which during combustion produce the least amount of air-polluting substances. Montana's coal, a formerly largely-untapped resource suddenly became an attractive source of energy because of its low sulphur content. The result, in terms of population increase and new jobs created resembles the famous gold rush booms of Montana's early history.

Any kind of sudden increase in population requires a vast amount of planning by state and federal government agencies in order to alleviate, as much as possible, the socio-economic problems that are an intimate part of any economic boom. Part of this planning includes the assurance that manpower resources are utilized to their fullest extent.

A prerequisite to any kind of meaningful action by manpower planners is working knowledge of what jobs currently exist and how many, what jobs will be created, and what occupations will be affected.

As a partial answer to these questions, this paper attempts to project the employment opportunities created by coal development in Montana in terms of three development forecasts or "scenarios" originally advanced by the Northern Great Plains Resource Council (NGPRC). These scenarios represent a minimal coal development, the "most probable" forecast, and an extensive or national crisis development forecast. For purposes of comparison we also included a "base" forecast which assumes no coal development. This "base" forecast and the three development scenarios were projected to the target

year 1980 by industry and an occupational breakdown, based on the industry projections, was constructed using an industry-occupational matrix.

II. ECONOMIC ASSUMPTIONS

The employment projections contained in this study are based on the assumption that Montana's economy will continue to parallel national economic trends, and Montana will continue to experience a 6% unemployment rate through 1980.

Nationally, through 1980 we are assuming peace-time conditions and no war or other catastrophic event will seriously alter the current rate and nature of economic growth. Scientific and technological advances will continue at about the same rate as in recent years. Current economic conditions, as well as patterns of consumption, will continue to change at about the same rate as in the recent past.

III. DEVELOPMENT FORECASTS

A. Base - The base forecast includes projections that do not consider coal development other than that which was present in historical data, i. e. before 1974. The base forecast is the foundation for preparing the other three Scenarios.

B. Scenario I - Scenario I provides for no development of coal resources other than those necessary to meet regional and previously committed demand. Coal exports are expected to reach 26 MMTPY (million short tons per year), and power generation is expected to produce 2,700 MW (megawatts) of electricity using more than 11 MMTPY of coal. The locations of coal development sites are provided on Map I.

C. Scenario II - Scenario II provides for a level of coal development considered most likely to occur, embodying large coal-fired generating plants and exports of coal, particularly to the electric generation sector of the market areas. It should be noted, at present, Montana is closely following this Scenario's expectations. Coal exports, affecting Montana's labor force, and power generation plants are the same as Scenario I through 1980. (See Map II.)

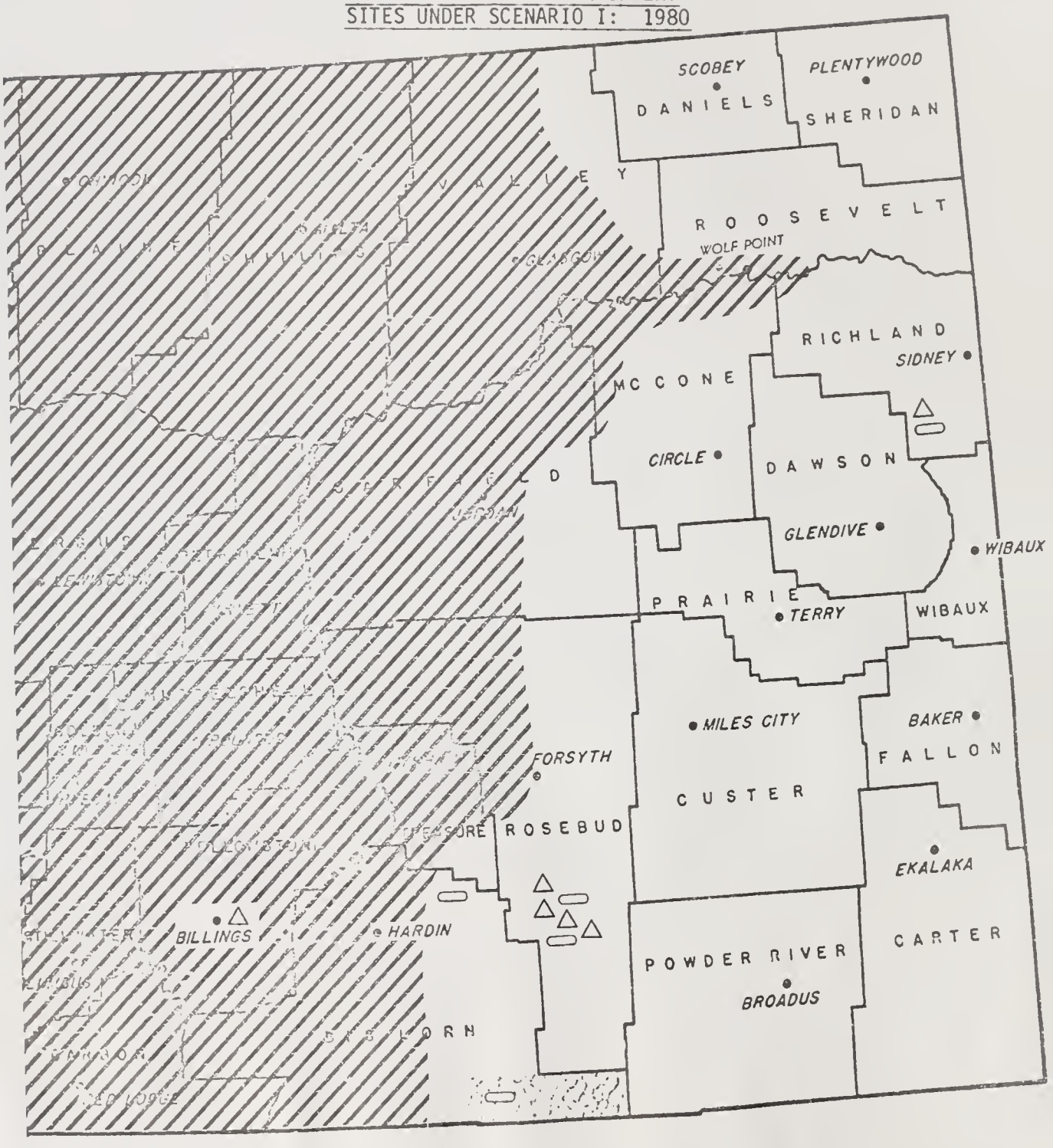
D. Scenario III - Scenario III provides for a national crisis situation with major reduction in oil imports, major restrictions in natural gas imports from Canada, and a major lag in nuclear generating capacity. Coal exports and power generation will be the same as that of Scenario I and Scenario II through 1980. Large coal gasification complexes will produce 500 MMCFD (million cubic feet per day of SNG (synthetic natural gas) and

will require 15 MMTPY of coal. (See Map III.)

NOTE: Scenario I calls for a total of 26 MMTPY of export coal, and power generation capacity of 2,700 MW requiring 11.2 MMTPY of coal. Scenario II calls for a total of 32 MMTPY of export coal, and power generation capacity of 2,700 MW requiring 11.2 MMTPY of coal. Scenario III calls for a total of 32 MMTPY of export coal, power generation capacity of 2,700 MW requiring 11.2 MMTPY of coal, and gasification capacity of 750 MMCFD of SNG requiring 23.2 MMTPY of coal. However, only the specifications under each development forecast affect Montana employment.

MAP I

MAP SHOWING COAL DEVELOPMENT
SITES UNDER SCENARIO I: 1980



LEGEND:

- Decker-Birney Area
- Export Mine Sites
- Power Generation Plants

ES R&A 8/5/74

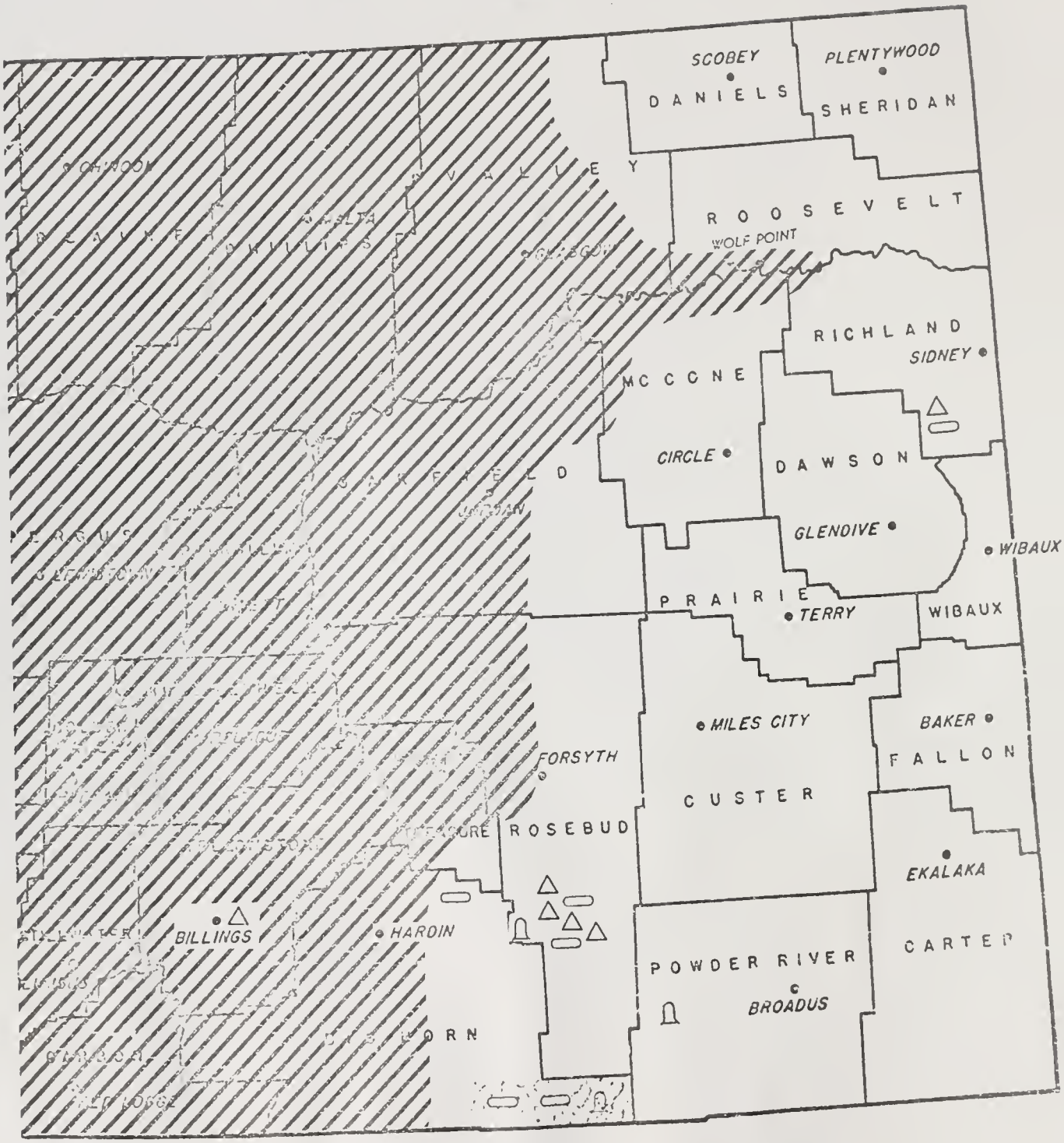
MAP 11
MAP SHOWING COAL DEVELOPMENT
SITES UNDER SCENARIO II: 1980

LEGEND:

- Decker-Birney Area
- Export Mine Sites
- Power Generation Plants

ES R&A 8/5/74

MAP III
MAP SHOWING COAL DEVELOPMENT
SITES UNDER SCENARIO III: 1980



LEGEND:

- Decker-Birney Area
- Export Mine Sites
- Power Generation Plants
- Gasification Plants

ES R&A 8/5/74

IV. DECKER - BIRNEY AREA

All labor force data provided herein denotes place of residence rather than place of work. The location of the Decker - Birney Area in the southeastern part of Montana provides no suitable place for workers to live in Montana, and it is expected that Sheridan and Acme, Wyoming will provide trade centers and living accommodations for these workers. Since Wyoming will benefit from these coal workers in terms of derivative employment, population increase and economic growth, Montana will not include these workers as part of its labor force. However, as this area builds up and workers start living in this area they will be included in Montana's labor force. Potential living accommodations and trade centers are not yet planned, but the number of workers may reach a point making these accommodations necessary by 1985.

V. COAL DEVELOPMENT IN MONTANA

Coal being considered for strip mine operations in Montana belongs to the Fort Union formation of Paleocene age. This area contains substantial deposits of sub-bituminous and lignite coal estimated to contain 40% of the United State's coal reserves or 24% of the Nation's recoverable coal reserves. Montana alone has more than 31 billion tons of coal reserves, nearly half of which are economically recoverable and nearly 80% are potentially recoverable. Parts of Canada and the states of North Dakota, South Dakota, Wyoming, and twenty of Montana's fifty-six counties fall within the Northern Great Plains Region.

Coal lying within the Northern Great Plains Region varies in quality and thickness of seams. The BTU/lb. (British Thermal Unit per pound) range of

the coal varies from 6,200 BTU/lb. to 13,000 BTU/lb. depending on whether it is lignite or sub-bituminous. The latter usually contains a higher BTU/lb., and increases in heat value under great overburdens. Strippable coal varies in thickness from 7 to 70 feet while the overburden ranges from 20 to 70 feet.

The accent on Montana's coal has been brought about by environmental pressure calling for legislation of cleaner-air standards. The coal mined in the Eastern United States contains a high sulphur content, as compared with the low sulphur content in the Northern Great Plains Region. The recent "energy crisis" has also increased the demand for coal to provide an alternate source of energy, until other means of producing energy are available. Coal can be processed and burned to provide electrical energy, liquid fuel, and synthetic natural gas. The coal in the Northern Great Plains Region can be mined economically through surface operations, and the sulphur content complies with the requirements of the cleaner-air standards.

Historically, commercial coal mining in Montana started around 1880, although some local mining was reported earlier. Lewis and Clark had reported the presence of coal seams along the Missouri River in 1805. Production rose steadily to 1918 reaching 4.5 million tons, and peak production of 4.8 million tons was reached in 1944 before declining to a low of .3 million tons in 1958. The use of other forms of energy had been responsible for this decline, i. e. steam, diesel fuel, etc.

As time passed, underground operations decreased while large strip mine operations increased. By 1972 there were only three underground mines as compared with thirty-five underground mines in 1953. Strip mine operation proved more economical and became more capital intensive as time passed. By 1972,

production exceeded 8 million tons for which 5 strip mines were mostly responsible, and coal production in 1973 exceeded the 10-million ton mark. The range of coal development for 1980 could be 3 to 7 times that of 1973.

Coal mined through 1980 will be used to fuel power generation plants producing electrical energy in other states, as well as in Montana. At present, there are two power generation plants producing electricity in Montana and two 350 MW plants being built. Two more plants of 700 MW each are expected to be built and operational before 1980. Large gasification plants, producing 250 MMCFD of SNG may also be constructed in Montana.

Future coal developments could go well beyond the stage of power generation and coal gasification. This would include the liquefaction of coal or the making of oil from coal. Although liquefaction plants have not yet been planned for or included in the scenarios, this type of development could be only ten years away. As of now, these types of plants are not competitive with other petroleum products. One such liquefaction plant would require 11 to 15 million tons of coal annually to produce 100,000 barrels of liquid fuels per day.

Possible envisions of coal development could include a multi-product complex which would be capable of producing electricity, liquid and gaseous fuels, and petrochemicals. However, this type of extensive development would not occur until after 1980 and is therefore beyond the scope of this paper.

VI. CONSTRUCTION:

Under each scenario, a construction force is required to open the mine, erect equipment, build plants, construct roads, lay railroad tracks, and build the many other facets related to the mining industry. For the purpose of this study it is assumed that all construction would be completed by the target year 1980 and no construction would be started during that year to meet target year 1985 projects. To describe the construction force, the following areas of coal development have been separated: strip mines, power generation plants, and gasification plants.

A. Strip Mines - There are basically two phases of construction for the strip mines: (1) the mine construction itself and (2) the assembling of equipment. To construct a 2 MMTPY mine, a total construction force of 178 men are required to complete the mine in one year. This requires 128 men for one year on surface facility construction and 50 men for one-half a year for equipment erection. A 10 MMTPY mine requires 160 men for two years to construct surface facilities and 100 men for one-half a year to erect the equipment for a total construction force of 260 men.

B. Power Generation - In constructing a power generation plant there are usually three phases of construction; (1) strip mine, (2) power generation plant, and (3) transmission lines. The power generation plant requires approximately 3.75 man years per MW to construct or a total 1,875 man years to construct a 500 MW plant. It is further assumed that it would require three years to complete

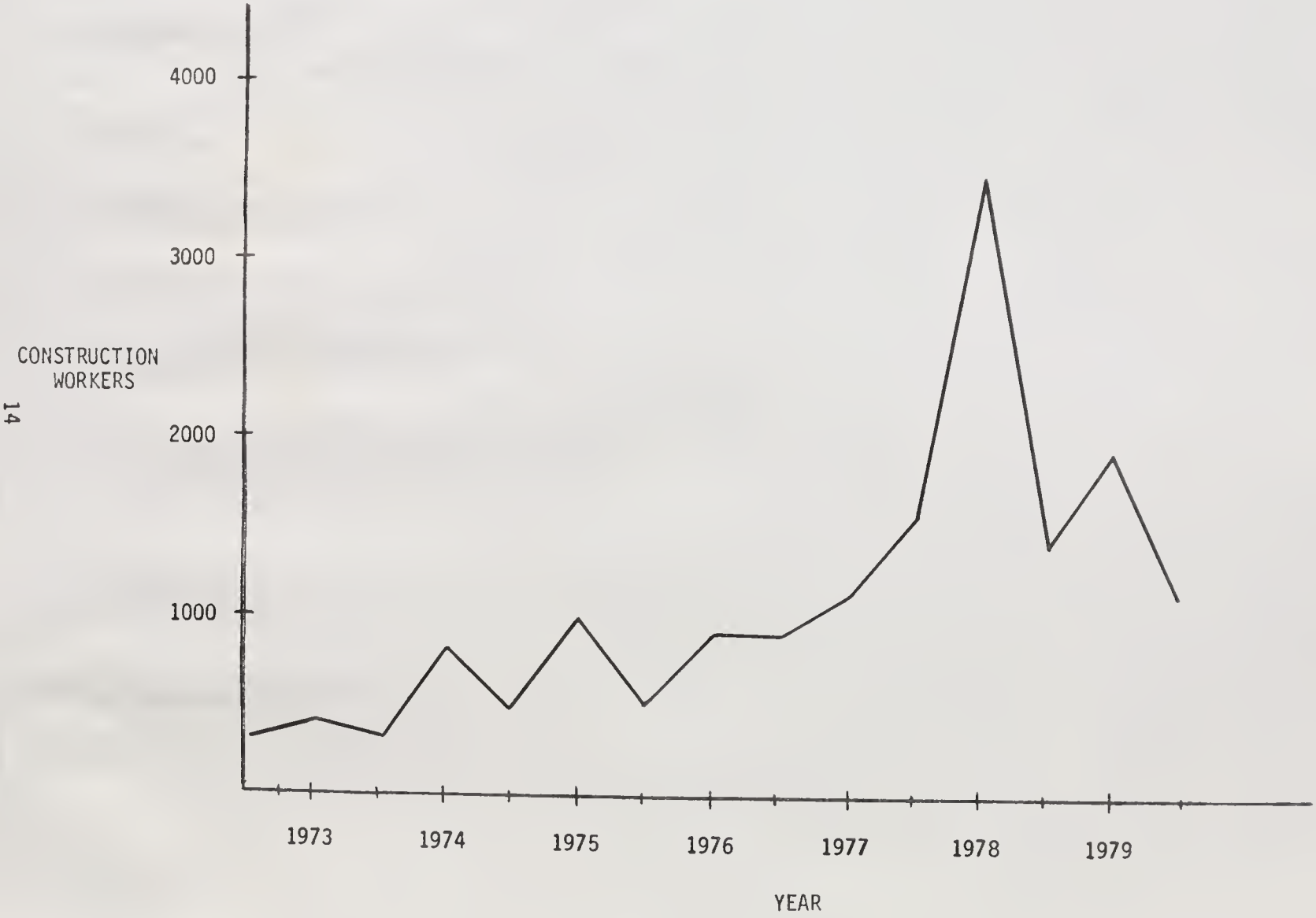
the construction of a power generation plant requiring 25% of the man years the first year, 50% the second year, and the remaining 25% the third year. To construct power transmission lines of 500 KV would require forty construction personnel at the rate of 2 miles per month.

C. Coal Gasification Complex - To construct a coal gasification complex of 250 MMCFD of SNG would require three years or 7.5 million man hours to complete. Peak construction would be nearly 3,000 workers and the labor force would be divided into the 25%, 50% and 25% parts as in constructing a power generation plant during a three year period. The construction phases of strip mine operations are also applicable to a coal gasification complex.

As in most construction work, seasonality was considered with most of the labor force working in the summer months and tapering off in the winter. Although no precise model was followed, it was assumed that a working day was eight hours and a working year was 255 days. Even though the target year 1980 will not account for this construction force, it will definitely provide an economic boost to Montana between now and 1980. The following graph depicts what can be expected of the construction force under Scenario II.

GRAPH I

CONSTRUCTION FORCE REQUIRED TO CONSTRUCT COAL DEVELOPMENT SITES UNDER SCENARIO II: 1973-1980



VII. INDUSTRY EMPLOYMENT OUTLOOK:

Total employment is expected to increase between 50,000 and 60,000 workers during the 1970-1980 decade, depending on the level of coal development. Under the Base forecast, only mining and the manufacturing of nondurable goods will decrease. Agriculture is not expected to change significantly from the 1970 level and should remain stable through 1980. All other industries will increase, with the services and wholesale and retail trade industries the volume leaders.

The level of coal development will determine the size of increases and the number of openings in each industry. For example, public utilities and sanitary services will increase only 7.8% during the decade under the Base forecast, but will increase 34.6% and 60.5% under Scenario I and II and Scenario III respectively. Mining will increase from a -15.5% under the Base forecast to 2% under Scenario III. Manufacturing, Federal administration and agriculture are not affected by coal development.

A. Agriculture, Forestry, and Fisheries - Agriculture, Montana's largest export industry, has for many years been the foundation of Montana's economy. Agriculture is still important as far as the revenue it provides the State, but is becoming less important as an employer. Agriculture is becoming more mechanized, producing more, and requiring less manpower. For 1980, under all forecasts, agriculture is not expected to grow in terms of employment, but normal attrition will still require workers in this industry.

B. Mining - Mining employment since 1940 has shown a continuous downward trend. The Base forecast for 1980 continued this trend to a low of 5,900 workers. Coal mining represents only 90 workers for this industry under the Base forecast, but Scenario I and II increased the number of miners to nearly 6,650 of which coal mining was entirely responsible. Scenario III increased the number of miners to more than 7,100 of which coal mining was again entirely responsible.

C. Contract Construction - While seasonal employment changes are very extreme, average annual employment levels since 1949, when plotted graphically, form a nearly horizontal line. This fact is in spite of large short-term construction projects such as the Minuteman Missile Project, Yellowtail Dam, Libby Dam, Interstate Highway, etc. This trend is expected to continue through 1980, with large short-term construction projects in the building of power generation plants, gasification complexes, constructing strip mine facilities, and equipment erection. By 1980 these construction projects should be complete and the trend will start to fall in line again. All sub-industries of contract construction are expected to show increases during the ten-year period 1970 - 1980 under each development forecast.

D. Manufacturing - Manufacturing in Montana, for the most part, is confined to lumber and wood products, primary metals, and food and kindred products. These three industries combined account for more than 70% of total manufacturing in Montana. Manufacturing growth has been slow and steady for the last ten years and this trend is expected to continue. Coal development will not have any significant effect on manufacturing, and all development forecasts are predicted to remain the same for manufacturing through target year 1980.

E. Transportation, Public Utilities and Communications - Railroad transportation has been declining for the past twenty years, mainly due to reduced passenger service; however, this trend is expected to reverse by 1980 as a result of the increased need for trains to transport coal. Public utilities were expected to show only moderate increases as in the Base forecast, but with coal development requiring more power generation plants, and possible gasification complexes, larger increases in public utilities can be expected. Electric light and power and electric-gas utilities are the industries expected to show the largest increases due to coal development.

F. Wholesale and Retail Trade - The wholesale and retail trade industries are expected to increase significantly during the ten year period 1970-1980. The wholesale industry is expected to show growth in all categories, with leading increases in farm products, raw material and lumber and construction materials. The retail industry will also show increases, but not as large as wholesale. Volume leaders will be general merchandise industries, food and dairy stores, possibly auto dealers and gas stations (depending on the energy crisis), and eating and drinking places. Coal development will generate an increase of between 2% and 4% over the expected base forecast or a total increase of 19% to 24% from 1970. Tourism is likely to be another primary reason for this accelerated growth.

G. Finance, Insurance and Real Estate - Although this industry is linked to the increase in population, real estate speculation will be on the rise.

H. Services - In recent years the availability of money and more leisure time has increased the demand for services of all kinds. The obvious result was a dramatic increase in the number of jobs in these fields, par-

ticularly those which are tourist oriented. Montana has been able to capitalize on its recreational resources, beauty, and environmental setting. The service industry, because of this and coal development, is expected to show large increases over the 1970 level of 40% to 43%.

I. Government - Government is expected to show a significant increase during the ten year period, with emphasis on state and local government. Coal development will increase the need for more state and local workers, if for nothing else, to expand present facilities, i.e., sewer, water, etc.

GRAPH II

PERCENT INCREASE (DECREASE) FROM 1970 BY INDUSTRY

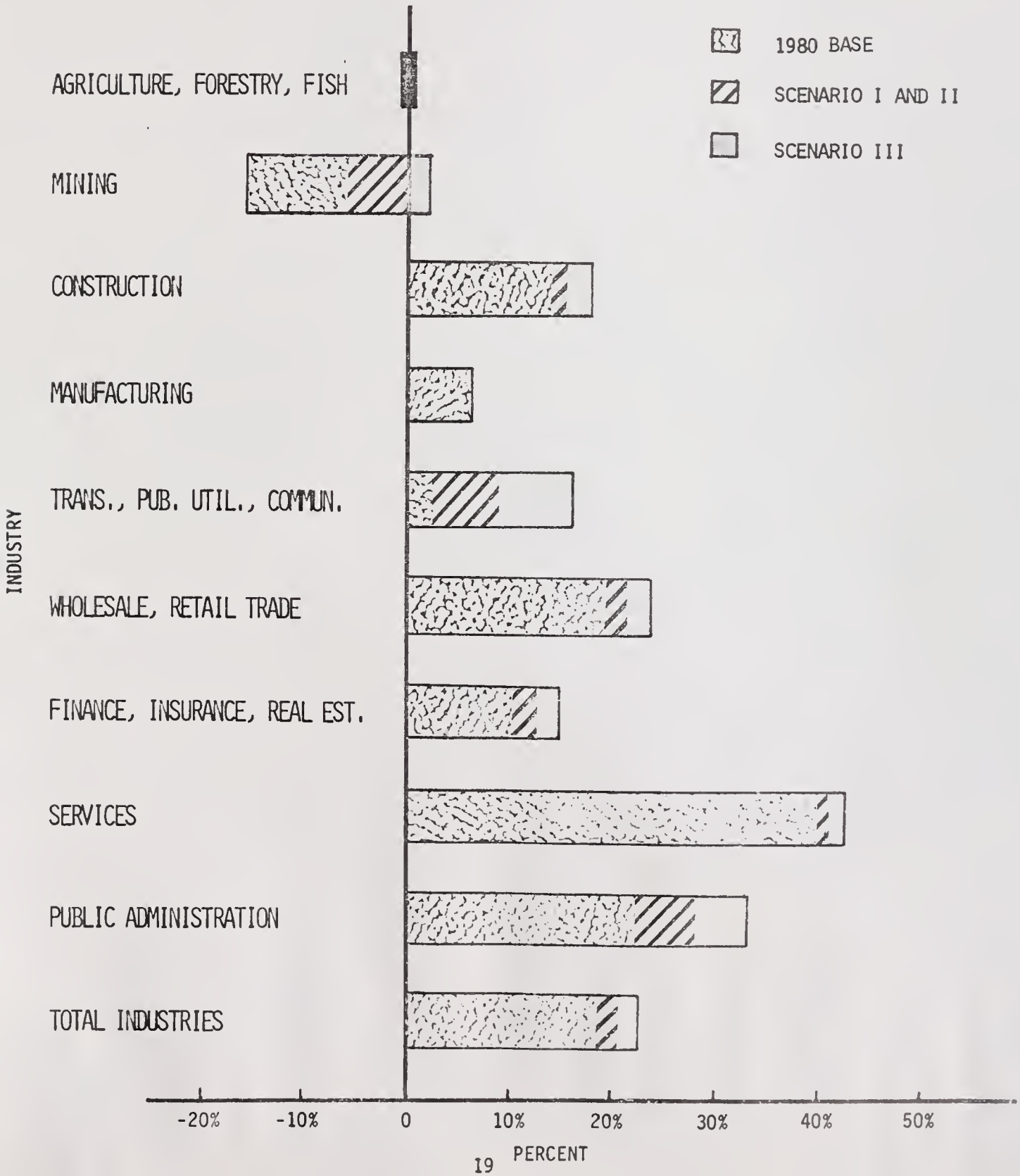


TABLE I

EMPLOYMENT BY INDUSTRY

		1980		
	1970	Base	Scenario I and II	Scenario III
Civilian Labor Force	282,660	334,040	340,020	345,040
Unemployment	18,660	20,040	20,400	20,700
Unemployment Rate	*6.6*	*6.0*	*6.0*	*6.0*
Total Employment	264,000	314,000	319,620	324,340
Agriculture, Forestry, Fisheries	34,240	34,240	34,240	34,240
Mining	6,990	5,910	6,640	7,130
Construction	18,880	21,640	21,940	22,190
Manufacturing	25,800	27,540	27,540	27,540
Durable Goods	16,470	18,380	18,380	18,380
Nondurable Goods	9,330	9,160	9,160	9,160
Transportation, Other Public Utilities	19,380	19,960	21,270	22,500
Transportation	12,230	12,460	12,700	12,910
Communications, Utilities, Sanitary	7,150	7,500	8,570	9,590
Communications	3,430	3,490	3,560	3,620
Utilities, Sanitary Services	3,720	4,010	5,010	5,970
Wholesale and Retail Trade	59,660	71,420	72,670	73,720
Wholesale Trade	10,830	14,030	14,260	14,460
Retail Trade	48,830	57,390	58,410	59,260
Finance, Insurance, Real Estate	9,730	10,800	11,010	11,180
Services	74,460	104,300	105,230	106,020
Public Administration (Government)	14,860	18,190	19,080	19,820
Federal Administration	7,040	8,350	8,350	8,350
State and Local Administration	7,820	9,840	10,730	11,470

TABLE II

PERCENTAGE OF TOTAL EMPLOYMENT BY INDUSTRY

		1980		
	1970	Base	Scenario I and II	Scenario III
Total Employment	100.0	100.0	100.0	100.0
Agriculture, Forestry, Fisheries	13.0	10.9	10.7	10.6
Mining	2.6	1.9	2.1	2.2
Construction	7.2	6.9	6.9	6.8
Manufacturing	9.8	8.8	8.6	8.5
Durable Goods	6.2	5.9	5.8	5.7
Nondurable Goods	3.6	2.9	2.8	2.8
Transportation, Other Public Utilities	7.3	6.4	6.7	6.9
Transportation	4.6	4.0	4.0	4.0
Communications, Utilities, Sanitary	2.7	2.4	2.7	2.9
Communications	1.3	1.1	1.1	1.1
Utilities, Sanitary Services	1.4	1.3	1.6	1.8
Wholesale and Retail Trade	22.6	22.7	22.7	22.7
Wholesale Trade	4.1	4.5	4.5	4.4
Retail Trade	18.5	18.2	18.2	18.3
Finance, Insurance, Real Estate	3.7	3.4	3.4	3.4
Services	28.2	33.2	32.9	32.7
Public Administration (Government)	5.6	5.8	6.0	6.1
Federal Administration	2.7	2.7	2.6	2.6
State and Local Administration	2.9	3.1	3.4	3.5

TABLE III

CHANGE FROM 1970 BY INDUSTRY

	Base		Scenario I and II		Scenario III	
	Net	%*	Net	%*	Net	%*
Total Employment	50,000	*18.9*	55,620	*21.1*	60,340	*22.8*
Agriculture, Forestry, Fisheries	-	-	-	-	-	-
Mining	-1,080	*-15.5*	-350	*-5.0*	140	*2.0*
Construction	2,760	*14.6*	3,060	*16.2*	3,310	*17.6*
Manufacturing	1,740	*6.8*	1,740	*6.8*	1,740	*6.8*
Durable Goods	1,910	*11.6*	1,910	*11.6*	1,910	*11.6*
Nondurable Goods	-170	*-1.8*	-170	*-1.8*	-170	*-1.8*
Transportation, Other Public Utilities	580	*3.0*	1,890	*9.8*	3,120	*16.1*
Transportation	220	*1.8*	470	*3.8*	680	*5.5*
Communications, Utilities, Sanitary	360	*5.0*	1,420	*19.9*	2,440	*34.2*
Communications	70	*2.0*	140	*4.0*	190	*5.6*
Utilities, Sanitary Services	290	*7.8*	1,280	*34.6*	2,250	*60.5*
Wholesale and Retail Trade	11,760	*19.7*	13,010	*21.8*	14,050	*23.6*
Wholesale Trade	3,200	*29.6*	3,430	*31.7*	3,620	*33.4*
Retail Trade	8,560	*17.5*	9,580	*19.6*	10,430	*21.4*
Finance, Insurance, Real Estate	1,060	*10.9*	1,270	*13.1*	1,450	*14.9*
Services	29,840	*40.1*	30,770	*41.3*	31,570	*42.4*
Public Administration (Government)	3,340	*22.5*	4,220	*28.4*	4,960	*33.4*
Federal Administration	1,310	*18.6*	1,310	*18.6*	1,310	*18.6*
State and Local Administration	2,030	*25.9*	2,910	*39.0*	3,650	*46.7*

** Computed from whole (unrounded) numbers.*

TABLE IV

ADDITIONAL EMPLOYMENT OPPORTUNITIES

CREATED BY COAL DEVELOPMENT

BY INDUSTRY

	Scenario I and II		Scenario III	
	Net	%	Net	%
Total Employment	5,620	1.8	10,340	3.3
Agriculture, Forestry, Fisheries	-	-	-	-
Mining	730	12.4	1,220	20.6
Construction	300	1.4	550	2.5
Manufacturing	-	-	-	-
Durable Goods	-	-	-	-
Nondurable Goods	-	-	-	-
Transportation, Other Public Utilities	1,310	6.6	2,540	12.7
Transportation	240	1.9	450	3.6
Communications, Utilities, Sanitary	1,070	14.3	2,090	27.9
Communications	70	2.0	130	3.7
Utilities, Sanitary Services	1,000	24.9	1,960	48.9
Wholesale and Retail Trade	1,250	1.8	2,300	3.2
Wholesale Trade	230	1.6	430	3.1
Retail Trade	1,020	1.8	1,870	3.3
Finance, Insurance, Real Estate	200	1.9	380	3.5
Services	930	0.9	1,720	1.6
Public Administration (Government)	890	4.9	1,630	9.0
Federal Administration	-	-	-	-
State and Local Administration	890	9.0	1,630	16.6

TABLE V

MONTANA TOTAL EMPLOYMENT BY INDUSTRY

1970, Base, Scenario I and II, and Scenario III

INDUSTRY	S. I. C. Code	1970	1980 Base	1980 Scenario I and II	1980 Scenario III
INDUSTRY, TOTAL		264,000	314,000	319,620	324,340
AGRI., FORESTRY & FISHERIES	A	34,240	34,240	34,240	34,240
Agriculture	01,02,07, exc. 0713	31,930	31,930	31,930	31,930
Forestry	08	2,270	2,270	2,270	2,270
Fisheries	09	40	40	40	40
MINING	B	6,990	5,910	6,640	7,130
Metal Mining	10	4,150	3,510	3,510	3,510
Coal Mining	11, 12	110	90	820	1,310
Crude Petroleum & Nat. Gas	13	1,950	1,650	1,650	1,650
Quarrying & Non-Metal Mining	14	780	660	660	660
CONSTRUCTION	C (15-17)	18,880	21,640	21,940	22,190
MANUFACTURING	D	25,800	27,540	NO CHANGE	
Durable Goods Manufacturing	19, 24, 25, 32-39	16,470	18,380		
Lumber & Wood Prod.exc.Furn.	24	8,830	9,890	FROM 1980 BASE	
Logging Camps & Contractors	241	2,000	2,300		
Sawmills,Millwk,Misc.Prod.	242, 244, 249	6,830	7,590		
Furniture & Fixtures	25	140	150		
Stone, Clay, Glass Prod.	32	1,040	1,160		
Glass & Glass Prod.	321-3	0	0		
Cement, Concrete, Plaster	324, 327	830	920		
Structural Clay Prod.	325	30	40		
Pottery & Related Prod.	326	0	10		
Misc.NonMet.Min.,Stone Prod.	328, 9	180	190		
Primary Metals Industries	33	4,610	5,140		
Blast Furnaces,Steel Works	3312, 3	50	50		
Other Prim.Metals Ind.	3315-7,332,3391,9	40	50		
Primary Non-Ferrous Metal	333-6, 3392	4,520	5,040		
Fabricated Metal Products	34, 19, exc. 194	420	460		
Machinery, exc. Electrical	35	260	280		
Farm Mach. & Equip.	352	60	70		
Office Machinery	357	20	20		
Misc. Machinery	351, 3-6, 8, 9	180	190		
Electrical Mach.,Equip.,Supp.	36	40	50		
Transportation Equip.	37	200	210		
Motor Vehicles & Equip.	371	30	30		
Aircraft & Parts	372	30	40		
Ship & Boat Building	373	30	30		
R.R. & Other Trans.Equip.	374, 5, 9	110	110		
Instruments & Allied Prod.	38	40	40		
Instruments & Fire Control	381-6, 194	40	40		
Watches & Clock Devices	387	0	0		
Misc. Manufacturing	39	250	280		

MONTANA TOTAL EMPLOYMENT BY INDUSTRY

1970, Base, Scenario I and II, and Scenario III

INDUSTRY	S. I. C. Code	1970	1980		
			Base	Scenario I and II	Scenario III
Nondurable Goods Manufact'g	20-23, 26-31	9,330	9,160	NO CHANGE	
Food & Kindred Prod.	20	4,510	4,650		
Meat Prod.	201	850	870	FROM 1980 BASE	
Dairy Prod.	202	860	890		
Canning,Preserving,Freezing	203	60	70		
Grain Mill Prod.	204	830	850		
Bakery Prod.	205	660	680		
Beverage Ind.	208	370	380		
Other Food Prod.	206, 7, 9	880	910		
Tobacco Manufacturing	21	0	0		
Textile Mill Prod.	22	100	100		
Apparel & Related Prod.	23	110	110		
Paper & Allied Prod.	26	510	520		
Pulp,Paper,Paperboard Mills	261-3, 6	470	490		
Paperbd.Containers,Boxes	265	20	20		
All Other Paper Prod.	264	20	10		
Printing,Pubshg,Allied Prod.	27	2,360	2,000		
Chemicals,Allied Prod.	28	420	430		
Synthetic Fibers	2823, 4	0	0		
Drugs & Medicine	283	40	40		
Paints,Varnishes,Rel. Prod.	285	30	30		
Other Chemicals	281, 2821, 2	350	360		
Petroleum Refining, Rel. Ind.	29	1,130	1,160		
Petroleum Refining	291	1,110	1,140		
Other Petrol. & Coal Prod.	295, 9	20	20		
Rubber, Misc.Plastic Prod.	30	160	170		
Rubber Prod.	301-3, 6	100	100		
Misc. Plastic Prod.	307	60	70		
Leather, Leather Prod.	31	40	40		
Leather Tanning,Finishing	311	0	0		
Footwear, exc. Rubber	313, 4	10	10		
All Other Leather Prod.	312, 5-7, 9	30	30		
TRANS, COMMUN, PUB. UTILITIES	E (40-49)	19,380	19,960	21,270	22,500
Transportation	40-47	12,230	12,460	12,700	12,910
Railroad Trans.	40	6,820	5,690	5,800	5,900
Local & Suburb. Trans., Interurb. Passgr. Trans.	41	860	1,120	1,140	1,160
Local & Interurb.exc.Taxis	411, 3-5,	700	900	920	930
Taxis	412	160	220	220	230
Motor Freight Tr. & Storage	42	3,740	4,610	4,700	4,780
Trucking	421, 3	3,360	4,140	4,220	4,280
Warehousing	422	380	470	480	500
Water Transportation	44	20	30	30	30
Transportation by Air	45	520	640	660	670
Pipelines	46	130	170	170	180
Transportation Services	47	150	190	190	200

MONTANA TOTAL EMPLOYMENT BY INDUSTRY

1970, Base, Scenario I and II, and Scenario III

INDUSTRY	S. I. C. Code	1970	1980		
			Base	Scenario I and II	Scenario III
Communication & Pub.Utilities	48-49	7,150	7,500	8,570	9,590
Communication	48	3,420	3,490	3,560	3,620
Telephone	481	2,510	2,570	2,620	2,660
Telegraph	482, 9	220	220	220	220
Radio & Television	483	690	710	720	730
Electric,Gas,Sanitary Serv.	49	3,720	4,010	5,010	5,970
Electric,Gas,Steam	491-3, 6	2,010	2,050	3,010	3,940
Water & Irrigation	494, 7	710	830	850	860
Sanitary Serv.,Other Util.	495	1,000	1,130	1,150	1,170
WHOLESALE & RETAIL TRADE	F (50-59)	59,660	71,420	72,670	73,710
Wholesale Trade	50	10,830	14,030	14,260	14,450
Motor Vehicles & Equip.	501	1,120	1,430	1,450	1,470
Drugs & Chemicals	502	380	500	500	510
Dry Goods & Apparel	503	70	90	90	90
Groceries & Related	504	1,920	2,510	2,510	2,580
Elec.Goods,Plumb.& Heatg.Sup.	506-7	860	1,120	1,130	1,150
Machinery & Equip.	508	1,640	2,120	2,160	2,190
Farm Produce & Misc.	505, 9	4,840	6,260	6,420	6,460
Retail Trade	52-59	48,830	57,380	58,400	59,260
Bldg.Mat.,Hardware,Farm Equip.	52	3,520	4,340	4,410	4,480
General Merchandise	53	7,260	8,600	8,750	8,880
Limited Price Stores	533	930	1,140	1,160	1,180
Other General Merchandise	53 exc. 533	6,330	7,460	7,590	7,700
Food & Dairy Stores	54	6,790	7,990	8,130	8,250
Auto Dealers & Gas Stations	55	9,590	11,300	11,500	11,660
Auto Dealers	55 exc. 554	4,600	5,490	5,590	5,660
Gas Stations	554	4,990	5,810	5,910	6,000
Apparel & Accessories	56	1,910	2,310	2,350	2,380
Furniture, etc.	57	1,770	2,110	2,150	2,180
Eating & Drinking Places	58	12,800	14,740	15,000	15,220
Misc. Retail Stores	59	5,190	6,000	6,110	6,200
Drug Stores	591	930	1,110	1,130	1,150
Other Retail Stores	59 exc. 591	4,260	4,890	4,980	5,050
FINANCE,INSURANCE,REAL ESTATE	G (60-67)	9,730	10,800	11,010	11,180
Finance	60, 61, 62, 67	4,680	5,340	5,440	5,530
Bank & Credit Agencies	60, 61	4,320	4,970	5,070	5,150
Stock Brokers & Invest. Co.	62, 67	360	370	370	380
Insurance	63, 64	2,900	3,170	3,230	3,280
Real Estate	65, 66	2,150	2,290	2,340	2,370

MONTANA TOTAL EMPLOYMENT BY INDUSTRY

1970, Base, Scenario I and II, and Scenario III

INDUSTRY	S. I. C. Code	1970	1980		
			Base	Scenario I and II	Scenario III
SERVICES	H (70,72,73,75,76,78-82,84,86,88,89)	74,460	104,300	105,230	106,020
Private Household	88	5,140	8,060	8,130	8,190
Services, exc. Private Hshd.	H (70,72,73,75,76, 78-82,84,86,89)	69,320	96,240	97,100	97,830
Hotels,Other Lodging Places	70	5,370	7,760	7,830	7,890
Personal Services	72	4,500	6,870	6,930	6,980
Laundry,Cleaning,Valet	721, 7	1,210	1,910	2,290	2,300
All Other Personal Serv.	722-6, 9	3,290	4,960	4,640	4,680
Misc. Business Serv.	73	2,380	3,350	3,380	3,400
Advertising	731-6, 9	140	220	220	220
Other Misc. Business Serv.	732-6, 9	2,240	3,130	3,160	3,180
Auto Repair Serv.,Garage	75	1,870	2,420	2,440	2,460
Misc. Repair Serv.	76	1,480	1,980	2,000	2,020
Entertainment & Recreation	78, 79	1,850	2,800	2,820	2,840
Motion Pictures & Theaters	78, 792	800	1,230	1,240	1,250
Misc. Ent. & Rec.	793, 1, 4	1,050	1,570	1,580	1,590
Medical & Other Health Serv.	80	17,460	25,160	25,380	25,570
Hospitals	806	10,900	15,890	16,030	16,150
Other Med. & Health Serv.	80, exc. 806	6,560	9,270	9,350	9,420
Legal Services	81	1,140	1,520	1,540	1,550
Educational Services	82, 84	25,430	33,130	33,420	33,670
NonProfit Membership Orgnzn.	86	8,620	8,280	8,360	8,420
Welfare & Religious	866, 7	3,600	5,190	5,230	5,270
Other NonProfit	861-5, 9	5,020	3,090	3,130	3,150
Misc. Services	89	2,230	2,980	3,010	3,030
Engineering & Architecture	891	560	820	830	840
Accounting & Bookkeeping	893	1,100	1,420	1,440	1,450
All Other Professional Serv.	892, 9	570	740	740	740
PUBLIC ADMINISTRATION	I (91-94)	14,860	18,190	19,080	19,820
Postal Services	91	1,780	2,110	2,110	2,110
Other Federal Public Adminis.	94	5,260	6,240	6,240	6,240
State Government	92	2,980	3,650	3,990	4,280
Local Government	93	4,840	6,190	6,740	7,190

VIII. Employment by Occupation: 1980

In recent years the occupational mix of Montana's labor force has shifted from blue collar and farm oriented occupations to white collar and service oriented occupations. Job opportunities in most professional and service occupations will be good to excellent in the period from 1975 to 1980. Craftsman and operative occupations, while declining as a percent of total employment will continue to provide many job opportunities, especially if extensive coal development occurs.

A. The Professional, Technical and Kindred group is Montana's largest occupational category. An expected 50,540 workers will be in this group by 1980 with coal development adding another 820 to 1,520 workers. Average annual job openings will range from 2,790 to 2,950 openings each year depending on the level of coal development.

B. The Managers, Officials, and Proprietors occupational group will increase by 32.7% during the 1970-1980 period and coal development could increase this further to a 36.6% level. Average annual job openings will be about 2,000 per year.

C. Sales Workers will increase between 3,890 and 4,430 workers during the decade and will provide 1,120 to 1,170 openings per year.

D. Clerical Workers will number 45,050 to 46,390 total jobs by 1980, an increase of 27.1% to 30.8%. Average annual openings will be 3,100 to 3,230 depending on the level of coal development.

E. Craftsmen, Foremen, and Kindred workers will provide 1,180 to 1,360 openings per year through 1980. Coal development will be directly responsible for 110 to 180 of these openings under Scenario I and II and Scenario III respectively. Total employment of this group will be 37,850 to 39,610 by 1980.

F. The outlook for the Operatives occupational group will benefit the most from coal development. Average annual openings will increase by 130 to 250 over the 1980 Base forecast of 930 openings per year. Total employment will be 31,090 to 33,570, an increase of 11.3% to 20.2% from 1970 levels.

G. Service Workers will provide more average annual job openings than the other groups with 3,570 to 3,700 openings each year and total employment will be the second largest occupational group with 49,060 to 50,380 workers in 1980. This group will account for 15.6% of total employement.

H. The Laborers occupation group is the smallest category in Montana with 11,260 to 11,570 workers forecast for 1980. This represents 3.6% of total employment. Only 10 to 30 average annual openings will be contributed by the development of coal.

I. The Farmers and Farm Managers group is expected to remain stable through 1980 with coal development having a minimal effect on this group. Mechanization and improved technology will account for the changing occupational structure within this group during the decade.

TABLE VI

EMPLOYMENT BY OCCUPATIONAL GROUP

		1980		
	1970	Base	Scenario I and II	Scenario III
Total, All Occupations	260,000	314,000	319,620	324,340
Professional, Technical, Kindred	38,400	50,540	51,360	52,060
Managers, Officials, Proprietors	27,420	36,380	36,970	37,450
Sales Workers	16,950	20,840	21,130	21,380
Clerical Workers	35,460	45,050	45,770	46,390
Craftsmen, Foremen, Kindred	33,220	37,850	38,930	39,610
Operatives	27,940	31,090	32,330	33,570
Operatives, except Transport	17,980	19,620	20,410	21,190
Transport Equipment Operatives	9,960	11,470	11,920	12,380
Service Workers	38,300	49,060	49,780	50,380
Service Workers, exc. Private Household	35,090	43,780	44,420	44,960
Private Household	3,210	5,280	5,360	5,420
Laborers, except Farm	10,380	11,260	11,420	11,570
Farmers, and Farm Workers	31,930	31,930	31,930	31,930
Farmers and Farm Managers	21,170	22,000	22,000	22,000
Farm Laborers, Farm Foremen	10,760	9,930	9,930	9,930

TABLE VII

OCCUPATIONS AS PERCENT OF TOTAL EMPLOYMENT

		1980		
	1970	Base	Scenario I and II	Scenario III
Total, All Occupations	100.0	100.0	100.0	100.0
Professional, Technical, Kindred	14.8	16.1	16.1	16.1
Managers, Officials, Proprietors	10.6	11.6	11.6	11.5
Sales Workers	6.5	6.6	6.6	6.6
Clerical Workers	13.6	14.3	14.3	14.3
Craftsmen, Foremen, Kindred	12.8	12.1	12.1	12.2
Operatives	10.7	9.9	10.1	10.3
Operatives, except Transport	6.9	6.2	6.4	6.5
Transport Equipment Operatives	3.8	3.7	3.7	3.8
Service Workers	14.7	15.6	15.6	15.6
Service Workers, exc Private Household	13.5	13.9	13.9	13.9
Private Household	1.2	1.7	1.7	1.7
Laborers except Farm	4.0	3.6	3.6	3.6
Farmers, and Farm Workers	12.3	10.2	10.0	9.8
Farmers and Farm Managers	8.1	7.0	6.9	6.8
Farm Laborers, Farm Foremen	4.2	3.2	3.1	3.0

TABLE VIII

CHANGE FROM 1970 BY OCCUPATIONAL GROUP

	Base		Scenario I and II		Scenario III	
	Net	%	Net	%	Net	%
Total, All Occupations	54,000	*20.8*	59,620	*22.9*	64,340	*24.7*
Professional, Technical, Kindred	12,140	*31.6*	12,960	*33.8*	13,660	*35.6*
Managers, Officials, Proprietors	8,960	*32.7*	9,550	*34.8*	10,030	*36.6*
Sales Workers	3,890	*23.0*	4,180	*24.7*	4,430	*26.2*
Clerical Workers	9,590	*27.1*	10,310	*29.1*	10,930	*30.8*
Craftsmen, Foremen, Kindred	4,630	*13.9*	5,710	*17.2*	6,390	*19.2*
Operatives	3,150	*11.3*	4,390	*15.7*	5,630	*20.2*
Operatives, except Transport	1,640	*9.1*	2,430	*13.5*	3,210	*17.8*
Transport Equipment Operatives	1,510	*15.2*	1,960	*19.8*	2,420	*18.2*
Service Workers	10,760	*28.1*	11,480	*30.0*	12,080	*31.5*
Service Workers, exc Private Household	8,690	*24.8*	9,330	*26.6*	9,870	*28.1*
Private Household	2,070	*64.3*	2,150	*66.7*	2,210	*68.8*
Laborers, except Farm	880	*8.4*	1,040	*9.9*	1,190	*11.4*
Farmers and Farm Workers	-	-	-	-	-	-
Farmers and Farm Managers	830	*3.9*	830	*3.9*	830	*3.9*
Farm Laborers, Farm Foremen	-830	*-7.7*	-830	*-7.7*	-830	*-7.7*

TABLE IX

ADDITIONAL EMPLOYMENT OPPORTUNITIES

CREATED BY COAL DEVELOPMENT

BY OCCUPATIONAL GROUP

	Scenario I and II		Scenario III	
	Net	%	Net	%
Total, All Occupations	5,620	*1.8*	10,340	*3.3*
Professional, Technical, Kindred	820	*1.6*	1,520	*3.0*
Managers, Officials, Proprietors	590	*1.6*	1,070	*2.9*
Sales Workers	290	*1.4*	540	*2.6*
Clerical Workers	720	*1.6*	1,340	*3.0*
Craftsmen, Foremen, Kindred	1,080	*2.8*	1,760	*4.7*
Operatives	1,240	*4.0*	2,480	*8.0*
Operatives, except Transport	790	*4.0*	1,570	*8.0*
Transport Equipment Operatives	450	*4.0*	910	*8.0*
Service Workers	720	*1.5*	1,320	*2.7*
Service Workers, except Private Household	640	*1.5*	1,180	*2.7*
Private Household	80	*1.5*	140	*2.7*
Laborers except Farm	160	*1.4*	310	*2.8*
Farmers and Farm Workers	-	-	-	-
Farmers and Farm Managers	-	-	-	-
Farm Laborers, Farm Foremen	-	-	-	-

TABLE X

AVERAGE ANNUAL JOB OPPORTUNITIES BY OCCUPATIONAL GROUP: 1970-1980

	Base Forecast			Scenario I and II			Scenario III		
	Industry Expansion	Replacement Needs	Average Annual Openings	Industry Expansion	Replacement Needs	Average Annual Openings	Industry Expansion	Replacement Needs	Average Annual Openings
Total, All Occupations	5,400	10,760	16,160	5,960	10,760	16,720	6,430	10,760	17,190
Prof., Tech., Kindred	1,210	1,580	2,790	1,300	1,580	2,880	1,370	1,580	2,950
Mgrs., Officials, Props.	900	1,040	1,940	950	1,040	1,990	1,000	1,040	2,040
Sales Workers	390	730	1,120	420	730	1,150	440	730	1,170
Clerical Workers	960	2,140	3,100	1,030	2,140	3,170	1,090	2,140	3,230
Craftsmen, Foremen, Kindred	460	720	1,180	570	720	1,290	640	720	1,360
Operatives	310	620	930	440	620	1,060	560	620	1,180
Operatives, exc Transport	160	450	610	240	450	690	320	450	770
Transport Equip. Oper.	150	170	320	200	170	370	240	170	410
Service Workers	1,080	2,490	3,570	1,150	2,490	3,640	1,210	2,490	3,700
- except Private Household	870	2,120	2,990	940	2,120	3,060	990	2,120	3,110
Private Household	210	370	580	210	370	580	220	370	590
Laborers, except Farm	90	220	310	100	220	320	120	220	340
Farmers and Farm Workers	0	1,220	1,220	0	1,220	1,220	0	1,220	1,220
Farmers and Farm Managers	80	930	1,010	80	930	1,010	80	930	1,010
Farm Laborers, Farm Foremen	-80	-290	210	-80	290	210	-80	290	210

TABLE XI

AVERAGE ANNUAL JOB OPPORTUNITIES

CREATED BY COAL DEVELOPMENT

BY OCCUPATIONAL GROUP

	Scenario I and II		Scenario III	
	Net	%	Net	%
Total, All Occupations	560	*3.5*	1,030	*6.4*
Professional, Technical, Kindred	90	*3.2*	160	*5.7*
Managers, Officials, Proprietors	50	*2.6*	100	*5.2*
Sales Workers	30	*2.7*	50	*4.5*
Clerical Workers	70	*2.3*	130	*4.2*
Craftsman, Foreman, Kindred	110	*9.3*	180	*15.3*
Operatives	130	*14.0*	250	*26.9*
Operatives, except Transport	80	*13.1*	160	*26.2*
Equipment Transport Operatives	50	*15.6*	90	*28.1*
Service Workers	70	*2.0*	130	*3.6*
Service Workers, except Private Household	70	*2.3*	120	*4.0*
Private Household	-	-	10	*1.7*
Laborers except Farm	10	*3.2*	30	*9.7*
Farmers and Farm Workers	-	-	-	-
Farmers and Farm Managers	-	-	-	-
Farm Laborers, Farm Foremen	-	-	-	-

TABLE XII

SELECTED OCCUPATIONS, BY OCCUPATIONAL GROUP UNDER SCENARIO I AND II HAVING AVERAGE ANNUAL OPENINGS OF 100 OR MORE

Occupation	Avg. Ann. Openings
Professional, Technical, Kindred	
Registered Nurses	380
Elementary School Teachers	530
Secondary School Teachers	200
Accountants	120
Clergyman	100
Managers, Officials, Proprietors	
School Admin., Elem., Secondary	110
Office Managers, N.E.C.	110
Other Managers, Administrators	1,170
Sales Workers	
Sales Representative, Wholesale Trade	140
Sales Clerks, Retail Trade	630
Salesmen, Retail Trade	110
Clerical Workers	
Secretaries	920
Typists	200
Bookkeepers	570
Cashiers	210
Counter Clerks, exc. Food	150
Receptionists	110
Teachers Aides, exc. Monitors	130
Craftsmen, Foremen, Kindred	
Carpenters	180
Operatives	
Laundry, Dry Clean Oper. N.E.C.	110
Delivery & Routemen	100
Truck Drivers	140
Service Workers	
Chambermaid, Maid, exc. Private	190
Cleaners & Charwomen	140
Janitors & Sextons	480
Bartenders	100
Cooks, exc. Private	310
Waiters	390
Food Workers, N.E.C. exc. Private	100
Nurses Aides, Orderlies	390

Occupation	Avg. Ann. Openings
Practical Nurses	140
Child Care Workers, exc. Private	110
Hairdressers, Cosmetologists	250
Child Care Workers, Private	280
Maids, Servants, Private	180
Farmers and Farm Workers	
Farmers (Owners & Tenants)	700
Farm Managers	310
Farm Laborers, Wage Workers	110

TABLE XIII

MONTANA EMPLOYMENT 1970-1980 BY OCCUPATION
UNDER DIFFERENT COAL DEVELOPMENT FORECASTS
and
ANNUAL JOB OPPORTUNITIES 1970 THROUGH 1980
BY OCCUPATION UNDER SCENARIO I & II

Occupation	AVERAGE EMPLOYMENT 1970	1980 Base	1980 Scenario I and II	1980 Scenario III	SCENARIO I AND II# ANNUAL JOB OPPORTUNITIES, 1970-1980 Industry Expansion	Replacement Needs	Average Annual Openings
TOTAL, ALL OCCUPATIONS	260,000	314,000	319,620	324,340	5,960	10,760	16,720
Professional, Technical & Kindred Workers	38,400	50,540	51,360	52,060	1,300	1,580	2,880
Engineers, Technical	2,330	2,790	2,830	2,870	50	30	80
Engineers, Chemical	70	80	80	80	0	*	*
Engineers, Civil	950	1,120	1,140	1,150	20	10	30
Engineers, Electrical	510	610	620	630	10	*	10
Engineers, Industrial	120	150	150	160	*	*	*
Engineers, Mechanical	150	180	180	180	*	*	*
Engineers, Metallurgical	30	40	40	40	*	0	*
Engineers, Mining	90	60	60	60	*	*	*
Engineers, Petroleum	40	50	50	50	*	0	*
Engineers, Sales	60	80	80	90	*	*	*
Engineers, Other	310	420	430	430	10	*	10
Life and Physical Scientists	870	1,160	1,180	1,190	30	20	50
Agricultural Scientists	160	240	240	250	10	*	10
Atmospheric, Space Scientists	100	140	140	140	*	*	*
Biological Scientists	160	210	210	220	10	*	10
Chemists	180	220	220	220	*	10	10
Geologists	240	300	300	310	10	*	10
Marine Scientists	20	40	40	40	*	0	*
Physicists & Astronomers	10	10	10	10	*	0	*
Mathematical Specialists	50	60	60	70	*	*	*
Mathematicians	10	10	10	10	*	0	*
Statisticians	40	50	50	60	*	*	*

* Less than 10.
\# Totals may not add due to rounding.

Occupation	AVERAGE EMPLOYMENT 1970	1980 Base	1980 Scenario I and II	1980 Scenario III	SCENARIO I AND II# ANNUAL JOB OPPORTUNITIES, 1970-1980 Industry Expansion	Replacement Needs	Average Annual Openings
Engineers, Science Technicians	2,210	3,150	3,200	3,240	100	40	140
Agri., Biolog. Tech. exc. Health	150	230	240	240	10	*	10
Chemical Technicians	190	200	200	200	*	*	*
Draftsmen	460	630	640	650	20	10	30
Electrical, Electronic Tech.	290	370	380	380	10	*	10
Industrial Engineering Tech.	10	10	10	10	0	0	0
Surveyors	600	750	760	770	20	10	30
Engineering, Science Tech., N.E.C.	510	960	970	990	50	20	70
Medical Workers, exc. Tech.	5,590	8,050	8,180	8,300	260	320	580
Chiropractors	100	150	150	150	10	10	20
Dentists	340	460	460	470	10	10	20
Dietitians	150	210	210	220	10	10	20
Optometrists	130	190	200	200	10	*	10
Pharmacists	360	420	430	440	10	10	20
Physicians, M.D. & Osteopaths	790	980	1,000	1,010	20	30	50
Podiatrists	30	50	50	50	*	*	*
Registered Nurses	3,250	4,790	4,860	4,930	160	220	380
Therapists	310	530	540	550	20	30	50
Veterinarians	130	270	280	280	10	0	10
Health Technologists & Technicians	930	1,640	1,670	1,690	70	60	130
Clinical Lab. Technol., Tech.	420	770	780	790	40	30	70
Dental Hygienists	10	20	20	20	*	0	*
Health Record Technol., Tech.	20	40	50	50	*	*	*
Radiologic Technol., Tech.	220	340	340	350	10	20	30
Therapy Assistants	20	30	30	30	*	0	*
Other Health Technol., Tech.	240	440	450	450	20	10	30
Technicians, exc. Health	740	1,100	1,120	1,130	110	20	130
Airplane Pilots	140	170	180	180	20	0	20
Air Traffic Controllers	180	250	250	250	30	*	30
Embalmers	10	10	10	10	*	0	*

* Less than 10.
\# Totals may not add due to rounding.

Occupation	AVERAGE EMPLOYMENT 1970	1980 Base	1980 Scenario I and II	1980 Scenario III	SCENARIO I AND II# ANNUAL JOB OPPORTUNITIES, 1970-1980 Industry Expansion	Replacement Needs	Average Annual Openings
Flight Engineers	10	10	10	10	*	0	*
Radio Operators	170	210	210	210	20	10	30
Other Technicians, exc. Health	230	450	460	470	50	10	60
Computer Specialists	250	330	330	330	30	*	30
Computer Programers	190	250	250	250	20	*	20
Computer Systems Analysts	40	60	60	60	10	0	10
Other Computer Specialists	20	20	20	20	*	0	*
Social Scientists	220	360	360	370	40	10	50
Economists	130	190	190	200	20	*	20
Psychologists	50	100	100	100	10	*	10
Urban & Regional Planners	40	70	70	70	10	0	10
Teachers	14,640	17,290	17,580	17,820	290	700	990
Adult Education Teachers	230	260	260	270	*	10	10
Agriculture Teachers	40	50	50	50	*	0	*
Art, Drama, Music Teachers	160	230	230	230	10	10	20
Atmospheric, Earth, Marine	60	90	100	100	*	*	*
Biology Teachers	90	140	140	140	*	*	*
Business, Commerce Teachers	70	110	110	120	*	*	*
Chemistry Teachers	100	110	110	120	*	*	*
Coaches, Phys. Ed. Teachers	130	160	160	160	*	*	*
Economics Teachers	40	60	60	60	*	0	*
Education Teachers	40	40	40	40	*	*	*
Elementary School Teachers	6,760	7,850	7,980	8,090	120	410	530
Engineering Teachers	80	90	90	90	*	*	*
English Teachers	130	160	160	160	*	10	10
Foreign Language Teachers	100	150	150	150	10	10	20
Health Specialties Teachers	60	110	110	110	10	*	10
History Teachers	60	70	70	70	*	0	*
Home Economics Teachers	60	80	80	80	*	*	*

* Less than 10.
\# Totals may not add due to rounding.

Occupation	AVERAGE EMPLOYMENT 1970	1980 Base	1980 Scenario I and II	1980 Scenario III	SCENARIO I AND II# ANNUAL JOB OPPORTUNITIES, 1970-1980 Industry Expansion	Replacement Needs	Average Annual Openings
Law Teachers	30	40	40	40	*	*	*
Mathematics Teachers	110	160	160	160	*	*	*
Physics Teachers	30	30	30	30	*	0	*
Preschool, Kindergarten Teachers	480	610	620	630	10	30	40
Psychology Teachers	60	100	110	110	*	*	*
Secondary School Teachers	4,260	4,570	4,650	4,710	40	160	200
Sociology Teachers	50	110	120	120	10	*	10
Social Science Teachers, N.E.C.	30	40	50	50	*	0	*
Misc. College & University	110	190	190	190	10	*	10
College, University, N.E.C.	520	790	800	810	30	20	50
Theology Teachers	*	10	10	10	*	0	*
Trade, Industial Teachers	20	30	40	40	*	0	*
Teachers N.E.C. exc. Coll., Univer.	730	850	860	880	10	50	60
Writers, Artists, Entertainers	2,040	2,840	2,890	2,930	80	70	150
Actors	10	20	20	20	*	0	*
Athletes & Kindred Workers	170	280	280	290	10	10	20
Authors	20	20	20	30	*	0	*
Designers	110	150	160	160	*	10	10
Editors & Reporters	360	410	410	420	10	20	30
Musicians & Composers	390	580	590	590	20	20	40
Painters & Sculptors	210	310	320	320	10	10	20
Photographers	230	330	340	340	10	10	20
Public Relations Men, Writers	240	340	340	350	10	10	20
Radio, TV Announcers	190	200	210	210	*	0	*
Writers, Artists, Entertain., N.E.C.	110	200	200	200	10	10	20
Other Professional, Technical	8,530	11,770	11,960	12,120	340	320	660
Accountants	2,040	2,510	2,550	2,580	50	70	120
Architects	140	210	210	210	10	*	10
Archivists & Curators	20	20	20	20	*	0	*

* Less than 10.
\# Totals may not add due to rounding.

Occupation	AVERAGE EMPLOYMENT 1970	1980 Base	1980 Scenario I and II	1980 Scenario III	SCENARIO I AND II# ANNUAL JOB OPPORTUNITIES, 1970-1980 Industry Expansion	Replacement Needs	Average Annual Openings
Clergymen	1,040	1,600	1,620	1,640	60	40	100
Religious, exc. Clergymen	200	290	290	300	10	10	20
Farm Management Advisors	160	160	170	170	*	*	*
Foresters, Conservationists	1,060	1,360	1,380	1,400	30	10	40
Home Management Advisors	30	30	30	30	*	0	*
Judges	100	100	100	100	*	10	10
Lawyers	850	1,210	1,220	1,240	40	30	70
Librarians	620	790	800	810	20	50	70
Operations, Systems Research	*	10	10	10	*	0	*
Personnel Labor Relations	690	1,020	1,040	1,060	40	20	60
Research Workers, N.E.C.	280	460	470	480	20	20	40
Recreation Workers	200	300	310	310	10	10	20
Social Workers	660	910	930	940	30	40	70
Vocational, Ed. Counselors	440	790	810	820	40	10	50
MANAGERS, OFFICIALS, PROPRIETORS	27,420	36,380	36,970	37,450	950	1,040	1,990
Buyers, Sales, Loan Managers	3,680	4,970	5,050	5,110	120	110	230
Bank, Financial Managers	1,230	1,610	1,640	1,660	40	30	70
Creditmen	130	160	170	170	*	10	10
Buyers, Shippers, Farm Prod.	270	320	320	320	*	10	10
Buyers, Wholealse, Retail	450	660	670	680	20	20	40
Purchasing Agents, Buyers, N.E.C.	280	370	380	380	10	10	20
Sales Manager, Retail Trade	760	1,080	1,090	1,110	30	20	50
Sales Manager, exc. Retail Trade	560	770	780	790	20	10	30
Administrators, Pub. Inspectors	4,770	5,430	5,510	5,590	70	200	270
Assess. & Control., Loc. Pub. Admin.	490	490	500	510	*	40	40
Construction Inspector, Pub.	40	40	40	40	*	*	*
Health Administrators	390	580	590	600	20	20	40
Inspectors, exc. Construct., Pub.	400	540	540	550	20	20	40
Officials, Admins., Pub.	1,730	1,780	1,810	1,830	20	60	80

* Less than 10.
\# Totals may not add due to rounding.

Occupation	AVERAGE EMPLOYMENT 1970	1980 Base	1980 Scenario I and II	1980 Scenario III	SCENARIO I AND II# ANNUAL JOB OPPORTUNITIES, 1970-1980 Industry Expansion	Replacement Needs	Average Annual Openings
Postmasters & Mail Supervisors	470	420	420	430	0	20	20
School Admin., College	260	400	410	420	20	10	30
School Admin., Elem., Secondary	990	1,180	1,200	1,210	30	30	60
Other Managers, Officials, Props.	19,310	26,000	26,410	26,750	710	740	1,450
Funeral Directors	170	260	260	270	10	10	20
Managers, Superintendants, Building	220	300	310	310	10	20	30
Office Managers, N.E.C.	1,260	1,880	1,900	1,920	60	50	110
Officials of Lodges, Unions	270	400	400	410	10	10	20
Railroad Conductors	440	470	480	480	*	10	10
Restaurant, Cafe, Bar Managers	1,630	1,700	1,730	1,750	10	60	70
Other Managers, Administrators	15,320	20,990	21,330	21,610	600	570	1,170
SALES WORKERS	16,950	20,840	21,130	21,380	420	730	1,150
Advertising Agents, Salesmen	190	230	240	240	10	10	10
Auctioneers	40	50	50	50	*	0	0
Demonstrators	160	150	150	150	*	10	10
Hucksters & Peddlers	770	830	850	860	10	40	50
Insurance Agents, Brokers, etc.	1,660	1,900	1,920	1,940	30	50	80
Newsboys	440	300	300	310	-10	10	0
Real Estate Agents, Brokers	630	710	710	720	10	30	40
Stock & Bond Salesmen	210	210	220	220	*	10	10
Sales Representative, Mfg.	710	800	810	820	10	10	20
Sales Repres., Wholesale Trade	2,150	3,060	3,100	3,140	90	50	140
Sales Clerks, Retail Trade	7,620	9,530	9,670	9,780	200	430	630
Salesmen, Retail Trade	1,810	2,310	2,340	2,370	50	60	110
Salesmen, Service & Construction	560	760	770	780	20	30	50
CLERICAL WORKERS	35,460	45,050	45,770	46,390	1,030	2,140	3,170
Stenographers, Typists, Secretaries	10,180	13,600	13,820	14,000	360	780	1,140
Secretaries, Legal	280	450	460	460	20	20	40

* Less than 10.

\# Totals may not add due to rounding.

Occupation	AVERAGE EMPLOYMENT 1970	1980 Base	1980 Scenario I and II	1980 Scenario III	SCENARIO I AND II# ANNUAL JOB OPPORTUNITIES, 1970-1980 Industry Expansion	Replacement Needs	Average Annual Openings
Secretaries, Medical	230	370	370	380	10	20	30
Secretaries, Other	6,620	9,490	9,640	9,770	300	550	850
Stenographers	1,030	760	770	780	-30	60	30
Typists	2,020	2,530	2,580	2,610	60	140	200
Office Machine Operators	950	990	1,010	1,030	10	50	60
Bookkeeping, Billing Operators	170	200	200	210	*	10	10
Calculating Machine Operators	20	20	20	20	*	*	*
Computer, Peripheral Equipment	190	280	280	290	10	10	20
Duplicating Machine Operators	40	50	50	50	*	*	*
Keypunch Operators	490	390	400	400	-10	30	20
Other Office Machine Operators	40	50	60	60	*	*	*
Other Clerical Workers	24,330	30,460	30,940	31,360	660	1,300	1,960
Bank Tellers	790	900	910	920	10	50	60
Billing Clerks	260	400	400	410	10	20	30
Bookkeepers	6,670	8,240	8,370	8,480	170	400	570
Cashiers	2,410	3,090	3,140	3,180	70	140	210
Clerical Assist., Social Welfare	10	20	20	20	*	0	*
Clerical Supervisors, N.E.C.	360	440	450	450	10	10	20
Collectors, Bill & Account	160	200	200	200	*	10	10
Counter Clerks exc. Food	940	1,560	1,580	1,600	60	90	150
Dispatcher, Starter, Vehicle	240	310	320	320	10	10	20
Enumerators & Interviewers	520	510	520	520	*	20	20
Estimators, Investigators, N.E.C.	740	930	940	960	20	30	50
Expeditors, Prod. Controllers	130	150	150	150	*	*	*
File Clerks	410	460	470	480	10	30	40
Insurance Adjusters, Examiners	240	280	290	290	*	10	10
Library Attendants, Assistants	550	730	740	760	20	40	60
Mail Carriers, Post Office	950	1,120	1,130	1,150	20	20	40
Mail Handlers, exc. Post Office	250	300	310	310	10	10	20

* Less than 10.
\# Totals may not add due to rounding.

Occupation	AVERAGE EMPLOYMENT 1970	1980 Base	1980 Scenario I and II	1980 Scenario III	SCENARIO I AND II# ANNUAL JOB OPPORTUNITIES, 1970-1980 Industry Expansion	Replacement Needs	Average Annual Openings
Messengers & Office Boys	140	130	130	130	*	10	10
Meter Readers, Utilities	200	180	180	190	*	*	*
Payroll, Time Keeping Clerks	240	320	320	330	10	10	20
Postal Clerks	1,130	1,260	1,280	1,300	20	40	60
Proofreaders	40	40	40	40	*	*	*
Real Estate Appraisers	170	220	220	220	10	10	20
Receptionists	1,010	1,330	1,350	1,370	30	80	110
Shipping, Receiving Clerks	550	650	660	670	10	20	30
Statistical Clerks	580	660	670	680	10	30	40
Stock Clerks, Store Keepers	860	1,060	1,080	1,100	20	20	40
Teacher Aides, exc. Monitors	720	1,440	1,470	1,490	70	60	130
Telegraph Messengers	10	10	10	10	*	0	*
Telegraph Operators	300	220	230	230	-10	10	0
Telephone Operators	1,220	1,200	1,220	1,230	*	70	70
Ticket Station, Express Agents	370	340	350	350	*	10	10
Weighers	110	120	120	130	*	10	10
Misc. Clerical Workers, N.E.C.	1,050	1,640	1,670	1,690	60	70	130
CRAFTSMEN, FOREMEN, KINDRED	33,220	37,850	38,930	39,610	570	720	1,290
Construction Craftsmen	10,360	12,300	12,650	12,870	230	230	460
Carpenters	3,540	4,220	4,340	4,410	80	100	180
Carpenters Apprentices	50	70	70	70	*	0	*
Brickmasons & Stonemasons	260	300	310	320	10	*	10
Brick, Stonemason Apprentices	20	10	10	20	*	0	*
Bulldozer Operators	520	620	640	650	10	10	20
Cement & Concrete Finishers	140	200	200	210	10	*	10
Electricians	1,470	1,760	1,810	1,840	30	30	60
Electricians Apprentices	60	70	70	70	*	0	*
Excavating, Grading, Machine Oper.	1,850	2,150	2,210	2,250	40	40	80
Floor Layers, exc. Tile Setters	100	110	120	120	*	0	*
Painter, Construction, Main.	670	700	720	740	10	20	30
Painter Apprentices	10	10	10	10	*	0	*
Paperhangers	10	10	10	10	*	0	*
Plasterers	30	30	30	30	0	*	*

* Less than 10.

\# Totals may not add due to rounding.

Occupation	AVERAGE EMPLOYMENT 1970	1980 Base	1980 Scenario I and II	1980 Scenario III	SCENARIO I AND II# ANNUAL JOB OPPORTUNITIES, 1970-1980 Industry Expansion	Replacement Needs	Average Annual Openings
Plumbers & Pipefitters	1,140	1,420	1,460	1,480	30	30	60
Plumber, Pipefitter Apprentices	60	80	80	80	*	*	*
Roofer & Slaters	90	120	120	120	*	*	*
Structural Metal Craft	270	350	360	360	10	*	10
Tilesetters	70	70	80	80	*	*	*
Foremen N.E.C.	3,970	4,340	4,460	4,540	50	100	150
Metalworking Craftsmen, exc. Mech.	1,800	2,040	2,100	2,140	30	40	70
Blacksmiths	70	70	70	70	*	*	*
Boilermakers	250	250	250	250	*	10	10
Job & Die Setters, Metal	*	10	10	10	*	0	*
Machinists	760	920	950	970	20	20	40
Machinist Apprentices	70	60	60	60	*	0	*
Millwrights	270	330	340	350	10	10	20
Molders, Metal	30	20	30	30	*	0	*
Molders Apprentices	10	30	30	30	*	0	*
Sheet Metal Workers, Tinsmiths	270	260	270	280	*	10	10
Sheet Metal Apprentices	40	60	60	60	*	0	*
Tool, Diemakers	30	30	30	30	*	0	*
Mechanics, Repairmen, Installers	9,210	10,730	11,040	11,230	180	170	350
Air Cond., Heating, Refrig.	220	370	380	390	20	10	30
Aircrafts	130	180	180	180	*	*	*
Auto Accessories Installers	20	20	20	20	*	0	*
Auto Body Repairmen	600	600	620	630	*	10	10
Auto Mechanics	3,510	3,870	3,980	4,050	50	0	50
Auto Mechanics Apprentice	40	50	60	60	*	0	*
Data Processing Machine Repairmen	50	80	80	80	*	0	*
Farm Implement	530	630	650	660	10	10	20
Heavy Equip. Mech., incl, Diesel	1,790	2,210	2,270	2,310	50	30	80

* Less than ten.

\# Totals may not add due to rounding.

Occupation	AVERAGE EMPLOYMENT 1970	1980 Base	1980 Scenario I and II	1980 Scenario III	SCENARIO I AND II# ANNUAL JOB OPPORTUNITIES, 1970-1980 Industry Expansion	Replacement Needs	Average Annual Openings
Household Appliance Mechanics	520	680	700	710	20	10	30
Office Machine Repairmen	130	170	170	170	*	*	*
Radio, Television Repairmen	510	610	630	640	10	10	20
Railroad, Car Shop Repairmen	600	590	610	620	*	10	10
Mechanics exc. Auto Apprentices	10	10	10	20	*	0	*
Other Mechanics & Repairmen	550	660	680	690	10	10	20
Printing Trade Craftsmen	820	700	720	730	-10	20	10
Bookbinders	50	40	40	40	*	*	*
Compositors & Typesetters	510	410	430	440	-10	10	0
Electrotypers, Stereotypers	10	10	10	10	*	0	*
Engravers, exc. Photoengravers	20	20	20	20	0	0	0
Photoengravers. Lithographers	20	20	20	20	*	0	*
Pressmen & Plate Printers	190	190	190	190	*	*	*
Printing Apprentices exc. Press	20	10	10	10	*	0	*
Transportation, Pub. Util. Craft.	2,290	2,350	2,420	2,460	10	40	50
Electric Power Linemen, Cablemen	540	580	600	610	10	10	20
Locomotive Engineers	700	750	770	790	10	20	30
Locomotive Firemen	120	80	80	80	*	*	*
Power Station Operators	100	90	90	90	*	*	*
Telephone Installers, Repairmen	580	620	640	650	10	10	20
Telephone Linemen, Splicers	250	230	240	240	*	*	*
Other Craftsmen, Kindred Workers	4,770	5,390	5,540	5,640	80	130	210
Bakers	390	420	440	440	*	10	10
Cabinetmakers	140	160	160	160	*	*	*
Carpet Installers	100	130	130	130	*	0	*
Cranemen, Derrickmen, Hoistmen	680	770	790	810	10	10	20
Decorators, Window Dressers	210	270	280	290	10	10	20
Dental Laboratory Technicians	50	60	60	60	*	*	*
Furniture & Wood Finishers	20	20	20	20	*	0	*

* Less than 10.
\# Totals may not add due to rounding.

Occupation	AVERAGE EMPLOYMENT 1970	1980 Base	1980 Scenario I and II	1980 Scenario III	SCENARIO I AND II# ANNUAL JOB OPPORTUNITIES, 1970-1980 Industry Expansion	Replacement Needs	Average Annual Openings
Glaziers	90	130	130	130	*	*	*
Inspectors, Log & Lumber	340	410	420	430	10	10	20
Inspectors, Other	510	560	580	590	10	10	20
Jewelers & Watchmakers	100	110	110	110	*	*	*
Millers, Grain, Flour, Feed	40	40	40	40	*	0	*
Motion Picture Projectionists	90	120	120	130	*	10	10
Opticians, Lens Grinder, Polisher	160	210	220	320	10	*	10
Piano, Organ Tuners, Repairmen	20	30	30	30	*	*	*
Shoe Repairmen	90	130	140	140	*	10	10
Sign Painters & Letters	60	60	60	60	*	*	*
Stationary Engineers	1,230	1,200	1,230	1,260	*	40	40
Stone Cutters, Stone Carvers	10	10	10	10	*	0	*
Tailors	50	50	50	50	*	*	*
Upholsterers	190	250	260	270	10	10	20
Craftsmen, Kindred Workers, N.E.C.	130	160	170	170	*	*	*
Craft Apprentices, N.E.C.	60	70	70	70	*	0	*
OPERATIVES	27,940	31,090	32,330	33,570	440	620	1,060
Operatives, exc. Transport	17,980	19,620	20,410	21,190	240	450	690
SemiSkilled Metalworking	2,300	2,700	2,810	2,920	50	40	90
Drill Press Operatives	10	*	*	*	*	0	*
Furnacemen, Smeltermen, Pourers	730	820	850	880	10	10	20
Grinding Machine Operators	60	70	70	70	*	*	*
Lathe, Milling Machine Operatives	90	90	90	100	*	*	*
Metal Platers	10	10	20	20	*	0	*
Punch Stamping Press Operatives	90	100	110	110	*	*	*
Solderers	10	10	10	10	*	0	*
Welders & Flame Cutters	1,300	1,600	1,660	1,730	40	30	70
SemiSkilled Textile	40	30	30	30	*	0	*
Carding, Lapping, Combing	10	*	*	*	*	0	*

* Less than 10.
\# Totals may not add due to rounding.

Occupation	AVERAGE EMPLOYMENT 1970	1980 Base	1980 Scenario I and II	1980 Scenario III	SCENARIO I AND II# ANNUAL JOB OPPORTUNITIES, 1970-1980 Industry Expansion	Replace-ment Needs	Average Annual Openings
Knitters, Loopers, & Toppers	*	*	*	*	*	0	*
Weavers	10	*	*	*	*	0	*
Other Textile Operatives	20	20	20	20	*	0	*
Semiskilled Packing, Inspecting	1,020	1,270	1,320	1,370	30	40	70
Checkers, Examiners, etc., Mfg.	200	240	250	250	*	10	10
Graders & Sorters, Mfg.	110	140	150	160	*	10	10
Meat Wrappers, Retail Trade	150	190	200	210	*	10	10
Packer, Wrapper, exc. Meat. Produce	510	630	650	680	10	20	30
Prod. Grader, Packer, exc. Fact., Farm	50	70	70	70	*	*	*
Other Operatives, exc. Transport	14,620	15,620	16,250	16,870	160	370	530
Asbestos, Insulation Workers	70	80	80	90	*	0	*
Assemblers	200	230	240	240	*	*	*
Blasters & Powdermen	50	50	50	50	*	0	*
Bottling, Canning Operatives	60	60	70	70	*	0	*
Chainmen, Rodmen, Axmen Surveying	250	290	310	320	10	0	10
Clothing Ironers & Pressers	430	600	630	650	20	40	60
Cutting Operatives, N.E.C.	250	280	290	310	*	10	10
Dressmaker, Seamstress, exc. Fact.	340	500	520	540	20	40	60
Drillers, Earth	510	430	450	470	-10	10	0
Dry Wall Installer, Lathers	70	100	100	110	*	0	*
Filer, Polisher, Sander, Buffer	140	130	230	140	*	*	*
Garage Workers, Gas Staion Atten.	2,440	2,680	2,780	2,890	30	40	70
Laundry, Dry Clean Oper. N.E.C.	800	1,280	1,340	1,390	50	60	110
Meat Cutter, Butchers, exc. Mfg.	650	660	680	710	*	10	10
Meat Cutters, Butchers	400	420	440	450	*	10	10
Milliners	20	10	10	10	*	0	*
Mine Operatives, N.E.C.	1,830	1,180	1,230	1,280	-60	30	-30
Mixing Operatives	120	120	130	130	*	*	*
Oilers, Greasers, exc. Auto	390	340	360	370	*	10	10

* Less than 10.
\# Totals may not add due to rounding.

Occupation	AVERAGE EMPLOYMENT 1970	1980 Base	1980 Scenario I and II	1980 Scenario III	SCENARIO I AND II# ANNUAL JOB OPPORTUNITIES, 1970-1980 Industry Expansion	Replacement Needs	Average Annual Openings
Painters, Mfg. Articles	90	100	100	100	*	*	*
Photographic Process Workers	130	180	190	190	10	10	20
Riveters & Fasteners	10	10	10	10	*	0	*
Sailors & Deckhands	10	*	*	*	*	0	*
Sawyers	1,230	1,450	1,510	1,570	30	20	50
Sewers & Stitchers	360	470	480	500	10	20	30
Stationary Firemen	440	430	440	460	*	10	10
Winding Operatives, N.E.C.	20	20	20	20	*	0	*
Misc, Machine Operatives	2,030	2,240	2,320	2,410	30	40	70
Operatives, N.E.C.	1,280	1,280	1,340	1,390	10	30	40
Transport Equipment Operatives	9,960	11,470	11,920	12,380	200	170	370
Boatmen & Canalmen	10	10	10	10	*	*	*
Bus Drivers	780	1,030	1,070	1,110	30	30	60
Delivery & Routemen	1,830	2,450	2,550	2,650	70	30	100
Fork Lift, Tow Motor Operatives	490	590	620	640	10	10	20
Motormen, Mine, Factory, Logging	110	80	80	90	*	*	*
Parking Attendants	50	60	60	60	*	*	*
Railroad Brakemen	590	590	610	630	*	10	10
Railroad Switchmen	520	530	550	570	*	10	10
Taxicab Drivers, Chauffeurs	210	270	280	300	10	10	20
Truck Drivers	5,370	5,860	6.090	6,320	70	70	140
SERVICE WORKERS	38,300	49,060	49,780	50,380	1,150	2,490	3,640
Cleaning Service Workers	8,240	11,280	11,430	11,580	320	490	810
Chambermaid, Maid, exc. Private	1,370	2,070	2,100	2,130	70	120	190
Cleaners & Charwomen	1,780	2,130	2,160	2,180	40	100	140
Janitors & Sextons	5,090	7,080	7,170	7,270	210	270	480

* Less than 10.
\# Totals may not add due to rounding.

Occupation	AVERAGE EMPLOYMENT 1970	1980 Base	1980 Scenario I and II	1980 Scenario III	SCENARIO I AND II# ANNUAL JOB OPPORTUNITIES, 1970-1980 Industry Expansion	Replacement Needs	Average Annual Openings
Food Service Workers	15,080	15,920	16,160	16,350	110	880	990
Bartenders	2,190	2,250	2,280	2,320	10	90	100
Busboys	300	280	280	290	*	*	*
Cooks, exc. Private	4,600	4,880	4,960	5,010	40	270	310
Dishwashers	1,110	1,220	1,240	1,250	10	50	60
Food Counter, Fountain Workers	460	400	410	410	-10	30	20
Waiters	5,190	5,440	5,520	5,580	30	360	390
Food Workers, N.E.C., exc. Private	1,230	1,450	1,470	1,490	20	80	100
Health Service Workers	4,860	7,110	7,220	7,300	240	390	630
Dental Assistants	220	310	310	310	10	20	30
Health Aides, exc. Nursing	420	750	770	770	30	30	60
Health Trainees	10	*	*	*	*	0	*
Lay Midwives	10	10	10	10	*	0	*
Nurse Aides, Orderlies	3,340	4,600	4,670	4,730	130	260	390
Practical Nurses	860	1,440	1,460	1,480	60	80	140
Personal Service Workers	4,360	6,360	6,450	6,530	210	330	540
Airline Stewardesses	10	10	10	10	*	0	*
Atten., Recreation, Amusement	420	610	610	620	20	20	40
Atten., Personal Service, N.E.C.	200	240	240	240	*	10	10
Baggage Porters & Bellhops	60	50	50	50	*	0	*
Barbers	580	780	800	810	20	30	50
Boarding, Lodging Housekeepers	50	10	10	10	*	*	*
Child Care Workers, exc. Private	760	1,110	1,130	1,140	40	70	110
Elevator Operators	70	40	40	40	*	*	*
Hairdressers, Cosmetologists	1,500	2,430	2,460	2,490	100	150	250
Housekeepers, exc. Private	460	690	700	710	20	30	50
Personal Service Apprentices	10	*	*	*	*	0	*
School Monitors	60	100	100	100	*	*	*
Ushers, Recreation, Amusement	60	80	80	90	*	*	*
Welfare Service Aides	120	210	220	220	10	10	20

* Less than 10.
\# Totals may not add due to rounding.

Occupation	AVERAGE EMPLOYMENT 1970	1980 Base	1980 Scenario I and II	1980 Scenario III	SCENARIO I AND II# ANNUAL JOB OPPORTUNITIES, 1970-1980 Industry Expansion	Replacement Needs	Average Annual Openings
Protective Service Workers	2,550	3,110	3,160	3,200	60	70	130
Crossing Guard, Bridgetenders	20	20	20	30	*	*	*
Firemen, Fire Protection	390	530	540	540	10	*	10
Guards & Watchmen	720	780	790	800	10	40	50
Marshals & Constables	40	50	50	50	*	0	*
Policemen & Detectives	1,040	1,310	1,330	1,340	30	20	50
Sheriffs & Bailiffs	340	420	430	440	10	10	20
Private Household Workers	3,210	5.280	5,360	5,420	210	330	540
Child Care Workers	1,670	2,750	2,790	2,820	110	170	280
Cooks, Private	30	50	50	50	*	*	*
Housekeepers, Private	410	690	700	710	30	40	70
Laundresses, Private	40	50	50	50	*	*	*
Maids, Servants, Private	1,060	1,740	1,770	1,790	70	110	180
LABORERS, EXCEPT FARM	10,380	11,260	11,420	11,570	100	220	320
Animal Caretakers, exc. Farm	310	360	360	370	10	10	20
Carpenter Helpers	170	130	130	140	*	*	*
Const. Labr., exc. Carpenter Help.	2,160	2,290	2,330	2,360	20	30	50
Fishermen & Oystermen	50	60	60	60	*	*	*
Freight, Material Handlers	1,880	2,060	2,090	2,120	20	30	50
Garbage Collectors	180	260	260	260	10	*	10
Gardeners, Groundkeepers, exc. Farm	710	970	980	1,000	30	40	70
Longshoremen & Stevedores	10	10	10	10	*	0	*
Lumbermen, Raftsmen, Woodchoppers	780	750	770	780	*	10	10
Stock Handlers	1,690	2,070	2,100	2,120	40	50	90
Teamsters	170	90	90	90	-10	*	-10
Vehicle Washers, Equip. Cleaners	260	330	330	330	-10	10	0
Warehousemen, N.E.C.	640	700	710	720	-10	10	0
Other Laborers	1,370	1,180	1,200	1,210	-20	40	20

* Less than 10.
\# Totals may not add due to rounding.

Occupation	AVERAGE EMPLOYMENT 1970	1980 Base	1980 Scenario I and II	1980 Scenario III	SCENARIO I AND II# ANNUAL JOB OPPORTUNITIES, 1970-1980 Industry Expansion	Replacement Needs	Average Annual Openings
FARMERS AND FARM WORKERS	31,930	31,930	31,930	31,930	0	1,220	1,220
Farmers & Farm Managers	21,170	22,000	22,000	22,000	80	930	1,010
Farmers (Owners & Tenants)	19,300	18,190	18,190	18,190	-110	810	700
Farm Managers	1,870	3,810	3,810	3,810	190	120	310
Farm Laborers, Farm Foremen	10,760	9,930	9,930	9,930	-80	290	210
Farm Foremen	580	760	760	760	20	20	40
Farm Laborers, Wage Workers	8,450	7,450	7,450	7,450	-100	210	110
Farm Laborers, Unpaid Family	1,700	1,680	1,680	1,680	*	60	60
Farm Laborers, Self-Employed	30	40	40	40	*	0	*

* Less than 10.
\# Totals may not add due to rounding.

METHODOLOGY

Projections of employment for the State of Montana under the different development forecasts began with a revision of employment by industry using current data and information from the labor force. Detailed historical series of industry were available from 1957 to 1973, along with coal development data submitted by the NGPRC and the BLS. An intensive study and analysis of employment levels and trends of past data determined the input to be used for this study. The most recent data were used in all cases to determine trends, and Montana's industry detail was compared to corresponding national detail.

The simple linear regression formula based on the method of least squares was chosen to develop the estimating technique because of the time involved and the relative ease in computing. The major disadvantage of this method is that only one variable is used to explain changes in local industries. If curvilinearity growth of an industry was noted by graphing data, the logarithmic form of the simple linear regression was used to best fit the curve (i.e., log y and/or log x).

The data used to determine the line of regression was assumed to be from a normal distribution and the t-test at 1% probability level provided statistical acceptance of this assumption.

The correlation coefficients (r) were greater than 90% for all industries except manufacturing and contract construction. Manufacturing was divided into durable goods and non-durable goods and provides correlation coefficients greater than 80%. The explained variation (r^2) was greater than 90% in all industries except mining and manufacturing. Mining was greater than 80% and durable goods

and non-durable goods were greater than 60% and 70% respectively. Contract construction was projected by using the standard deviation, as no independent variable provided a significant correlation coefficient. In addition, the historical series, when graphed, produced a nearly horizontal line. The standard error of contract construction was 2.35% at ± 1 standard deviation and provided a reliable range in which to forecast. Coal development employment forecasts under each scenario were developed from the number of workers required to operate and maintain strip mines, power generation plants, and coal gasification plants, and the derivative employment resulting from these workers. The primary and derivative employment were then added to the base forecast to arrive at scenario totals.

Industry and occupational data have been rounded to the nearest ten (10) providing more meaningful figures; however, this does not necessarily indicate the level of accuracy.

BIBLIOGRAPHY

U. S. Bureau of Labor Statistics, Employment and Earnings, Vols. 6-20. Washington: Government Printing Office, 1960-1973.

U. S. Bureau of Labor Statistics, Tomorrow's Manpower Needs, Vol. III, Bulletin No. 1737. Washington: Government Printing Office, 1971.

U. S. Department of Labor, Manpower Administration, Handbook for Projecting Employment by Occupation for State and Major Areas. Washington, Draft Publication, 1970.

U. S. Bureau of Labor Statistics, Interim Manpower Projections Program. Kansas City, Draft Publication, 1974.

U. S. Bureau of the Census, United States Census of Population: 1970, General Social and Economic Characteristics, Montana. Washington Government Printing Office, 1971.

U. S. Bureau of the Census, United States Census of Population: 1970 Detailed Characteristics, Montana. Washington: Government Printing Office, 1972.

U. S. Bureau of Mines, Northern Great Plains Resources Program, National and Regional Energy Considerations. Draft, 1973.

U. S. Bureau of Labor Statistics, Northern Great Plains Resource Program. Kansas City, Draft 1973.